

Module Details	
Module Title:	Numerical Analysis
Module Code:	COS5018-B
Academic Year:	2019-20
Credit Rating:	20
School:	Department of Computer Science
Subject Area:	Computer Science
FHEQ Level:	FHEQ Level 5
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	Hours
Lectures	12
Tutorials	12
Laboratory	12
Directed Study	164

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2 (Feb - May)

Module Aims
To introduce the basic concepts of error analysis and iteration, and elementary numerical methods for solving algebraic equations. To develop and implement efficient numerical algorithms using Matlab/Scilab. To instil an appreciation of the techniques available for numerical interpolation and linear algebra.

Outline Syllabus
a) Errors; iteration; iterative solution of $f(x) = 0$; systems of equations, finite difference methods; numerical integration; polynomials; interpolation, polynomial least squares approximation; assembly language

b) Introduction to Computer Theory: Basic concepts of formal language theory; alphabets, strings, languages, operations on string and languages, recursive definitions, regular expressions, finite automata, deterministic and non-deterministic finite automata, Kleene's theorem, pushdown automata context-free grammars, turing machines, computability, decidability.

c) Introduction to probability and statistics: Averages, standard deviation, probability and conditional probability of events, probability distribution.

Learning Outcomes

1	show a breadth of knowledge and appreciation of some of the basic techniques of numerical analysis and explain the fundamental concepts of computer theory.
2	apply in realistic situations the fundamental methods of numerical algebra and calculus and construct/validate many of the logical tools inherent in the construction and analysis of computer systems.
3	learn and work independently with patience and persistence using good general skills of organization and time-management, be adaptable with a readiness to assess problems from new areas logically through an analytical approach, write coherently and clearly communicate results.

Learning, Teaching and Assessment Strategy

The basic theory and illustrative examples are presented and developed in formal lectures. Complementary tailor-made example sheets are provided. These are discussed, and assistance with their solution is provided in laboratory sessions, either on a one-to-one basis or as a staff or student-led group, as appropriate.

Formative tasks are provided to encourage ongoing digestion of the material, with the extent of the cumulative knowledge and skills acquired assessed through a coursework assignment and a formal examination.

Mode of Assessment

Type	Method	Description	Length	Weighting
Referral	Examination - closed book	Supplementary Examination	3 hours	100%
Summative	Examination - closed book	Examination	2 hours	70%
Summative	Coursework	Individual Coursework		30%

Reading List

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>.

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.